UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/372,636	08/11/1999	WOLFGANG HORNSCHEMEYER	364/56	1684

26646 7590 10/01/2004

KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER	
KERNS, KEVIN P	
ART UNIT	PAPER NUMBER
1725	

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary	Application No.	Applicant(s)	
	09/372,636	HORNSCHEMEYER ET AL.	
	Examiner	Art Unit	
	Kevin P. Kerns	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,10-12 and 14-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-12 and 14-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

The term "narrower" in claims 1 and 14 is an unclear term which renders the claim indefinite. Although "narrower" is deemed to mean "reduction in width", it remains unclear with respect to what direction (as a part of what larger structural feature?) the channels/bore holes become "narrower"? This terminology is also not clearly set forth in the specification.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-7, 10-12, and 14-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to claims 1 and 16, the limitations "cooling bore holes running parallel to the pouring direction and at least one of running closer to the pouring surface,

being configured narrower, and being spaced closer to each other in at least one portion of the die body" are considered as new matter, as none of the prior drawings (replacement drawing Figure 3 also contains new matter in the form of cooling bore holes) shows "cooling bore holes running parallel to the pouring direction" (also shown only as a top view, not a "lateral" view). As a result (without a "lateral" view of the cooling bore holes of Figure 3), there is no clear evidence that the cooling bore holes actually run parallel to the pouring direction, and hence, claims 1 and 16 (taken in view of proposed Figure 3) are based on a description which is not enabling.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-7, 10-12, 14, and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 1, it is unclear what is meant by the limitations "at least one of running closer to the pouring surface, being configured narrower, and being spaced closer to each other in at least one portion of the die body". Is the term "the cooling bore holes" missing after "at least one of", or is the claim intended to mean "at least one of 1) running closer to the pouring surface, 2) being configured narrower, and (or) 3) and being spaced closer, in at least one portion of the die body" (the latter perhaps requiring Markush language for clarity)?

With regard to claim 1, it is unclear what is meant by the limitation "being configured narrower" for the description of the cooling bore holes. Does "configured narrower" mean 1) bore holes of constant diameter being configured narrower, 2) bore holes tapering (thus being configured narrower), 3) being configured narrower in terms of space between individual bore holes, or 4) yet another possible meaning?

The term "narrower" in claim 14 is an unclear term which renders the claim indefinite. Although "narrower" is deemed to mean "reduction in width", it remains unclear with respect to what direction (as a part of what larger structural feature?) the channels/bore holes become "narrower".

Claim 14 recites the limitation "the funnel". There is insufficient antecedent basis for this limitation in the claim, as only claims 5-7 and 16 disclose the term "funnel", not claims 1 and 12, from which claim 14 is dependent.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1, 10, 12, and 15 insofar as definite are rejected under 35 U.S.C. 102(b) as being anticipated by Mallener (US 3,595,302).

Mallener discloses a cooling structure for a continuous casting mold in which cooling mold plates with coolant grooves (an array of coolant holes 16a running parallel to the pouring direction and fed by coolant feeder grooves (22,23), serving as coolant channels) form a casting mold (die), such that the grooves 16a in the middle and upper portions are (at least 20%) closer together and deeper to permit greater heat abstraction through the middle and upper portions, which are thermally and mechanically stressed areas (abstract; column 2, lines 7-11 and 49-75; column 3, lines 1-75; column 4, lines 1-49; and Figures 1-7). A uniform temperature gradient is obtained by the preferential cooling (differential heat flow) of the upper portion of the mold (column 1, lines 34-39; and column 3, lines 36-44 and 56-62).

8. Claims 1-7, 10-12, and 14-16 insofar as definite are rejected under 35 U.S.C. 102(e) as being anticipated by Grove et al. (US 5,927,378).

Grove et al. disclose a continuous casting mold assembly (funnel-shaped with billet-entrance side wider than billet-exit side) in which molten metal is shaped (formed) and cooled within the casting space, further containing a selective cooling structure to accommodate heat transfer inequality due to circulation patterns, which lead to mold deterioration, particularly in the meniscus region 28 of the mold assembly (abstract; column 1, lines 60-63; column 2, lines 4-30; column 3, lines 12-61; and Figures 2 and

3). The liner plates are conventionally made of copper (column 1, lines 12-15). The mold assembly has a plurality of cooling slots (an array of grooves/holes running parallel to the pouring direction), in which the area around the meniscus (a thermally stressed area) contain slots machined to be deeper to produce an enhanced cooling effect at the area proximate to the meniscus 28, while producing a diminished cooling effect to other portions of the assembly (column 3, lines 28-67; column 4, lines 1-19; and Figures 2 and 3). The slot width (e.g. the gradually narrower slots 6 and 7 of Figure 2, with respect to slot 5 nearer the molten metal pouring side), length, spacings relative to transition region III (stressed area), and/or depths of the slots (see slots 1-19 in Figure 2), as well as the residual thickness parameters are varied accordingly along the funnel mold wall (column 4, lines 20-53; and Figures 2 and 3). The variable wall thickness in the meniscus region 28 (thermally stressed area of the broad-side wall of the mold liner assembly) is reduced on the order of a few millimeters (column 2, lines 4-30; column 4, lines 20-53; and Figures 2 and 3).

9. Claims 1-5, 10, 12, and 15 insofar as definite are rejected under 35 U.S.C. 102(a) as being anticipated by Stagge et al. WO97/43063). Note: for the Stagge et al. reference, page numbers and lines herein refer to the English translation of this German reference (provided in the prior office action of June 6, 2001). See the prior office action for the corresponding German pages/lines, if necessary.

Stagge et al. teach a funnel-shaped liquid-cooled chill mold (casting die) with a form-giving casting die body (page 6, lines 2-8; and Figure 1), which is made of a

material of high-heat conductivity, namely copper (page 3, lines 3-12; page 6, lines 17-19; and Figure 3). The cooling-surface side of the chill mold, comprised of a cooling zone with multiple cooling channels (an array of grooves/holes running parallel to the pouring direction) for greater heat flow dissipation, is oriented on the sides of the mold with the thermally and mechanically stressed areas of the mold (page 4, lines 2-26; page 5, lines 1-5; page 6, lines 24-26; and Figures 2-4). The liquid-cooled chill mold (casting die) includes a cavity that is composed of two broad-side walls and narrow-side walls delimiting the width of the slab, or billet (page 6, lines 2-16). Deeper grooves are provided around the metal bolts for optimized cooling in these areas (Figures 3 and 4). The cross-section of the mold at the pouring-in-side end is greater than at the billet-exit-side end, or of a descending funnel shape with a hollow cavity becoming smaller in the pouring direction (page 4, lines 6-8; and Figure 1).

Response to Arguments

10. The examiner acknowledges the applicants' amendment and proposed drawing corrections provided with the request for continued examination, all of which were received by the USPTO on August 6, 2004. The applicants' amendments/remarks have overcome a portion of the prior objections to the drawings, specification, and claim 12, as well as a portion of the prior rejections under 35 USC 112, 1st and 2nd paragraphs. Claims 1-7, 10-12, and 14-16 remain under consideration in the application.

11. Applicants' arguments filed August 6, 2004 have been fully considered but they are not persuasive.

With regard to the applicants' arguments/comments addressing the objections to the specification and the 35 USC 112, 1st and 2nd paragraph rejections on pages 8-14 of the amendment, the examiner respectfully disagrees with the applicants' assertion that the remaining issues (in paragraphs 1, 3, and 5 above) are clearly set forth to one of ordinary skill in the art. There are a plurality of possible interpretations of the limitations of claims 1 and 14, even in view of the applicants' definition of "narrower" provided in the appendix (dictionary). Also, the specification remains unclear as it relates to claims 1 and 14. As a result, one of ordinary skill in the art would be unable to reasonably reconstruct the applicants' invention without undue experimentation in view of the plurality of possible interpretations of the term "narrower" (see paragraphs 1, 3, and 5 above – at least three possible interpretations are set forth in paragraph 5). Furthermore, the "parallel" cooling bore holes are not clearly set forth in Figure 3, as Figure 3 only shows a top view, not a "lateral" view. On page 9 of the applicants' remarks, original claim 12 also shows no basis for the term "parallel". Also, the term "funnel" in claim 14 continues to lack proper antecedent basis (see paragraph 5 above).

With regard to the applicants' arguments/comments addressing the prior art rejections on pages 14-17 of the amendment, it is noted that the new matter and indefinite language (see 35 USC 112, 1st and 2nd paragraph sections above) render the selected claims rejected under corresponding sections of 35 USC 102 "insofar as definite" in paragraphs 7-9 above, as the broadest reasonable interpretation of these

indefinite claims would render the claims as anticipated by these references. Importantly, cooling bore holes exist in the three prior art references, with the array of bore holes arranged parallel to the pouring direction. However, a clear illustration of the term "parallel" is absent from the originally filed drawings, specification, and claims, and is considered as new matter (see paragraph 3 and explanation above). Furthermore, and contrary to the applicants' assertion in their major argument, the cooling channels and/or cooling grooves are to be considered as cooling bore holes, as these structures are enclosed on at least on three sides and are produced by "boring" in the form of drilling or machining, as thus would define "cooling bore holes" (as set forth in all three prior art references).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns Kevin Kerns 9/29/04
Examiner
Art Unit 1725

KPK
kpk
September 29, 2004